

Collaboration Opportunities with NASA Ames



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NASA Ames Research Center (ARC), located in California's Silicon Valley, creates partnerships with government agencies, educational institutions and industry in pursuit of the nation's Vision for Space Exploration; support of knowledge-based economic development; and for enhanced societal well-being



2300 Employees
(1200 Civil Service/1100 Contractor and Other)

\$600+M Annual Budget





NASA Ames Industry Partners





Prognostics Center of Excellence Partners

GOVERNMENT

- *Other NASA centers*
- ASC / ISO
- Idaho National Labs
- JSF
- USAF
- US Army

INDUSTRY

- Boeing
- Dell
- Global Technology Connection
- Honeywell
- Impact Technologies
- Moog
- NEMOmetrics
- Qualtech Systems Inc.
- Ridgetop Group
- Scientific Monitoring Inc.
- Sentient Corporation

ACADEMIA

- Auburn University
- Arizona State
- Cal Poly
- Clarkson
- Georgia Tech
- University of Maryland
- Montana Tech
- Penn State ARL
- Stanford
- UCLA
- Vanderbilt



Partnering Options

- Small Business Innovative Research (SBIR) Program
- Small Business Technology Transfer (STTR) Program
- NASA Research Announcements (NRAs)
- IPP Seed Fund
- Space Act Agreements
- Licensing / Software Agreements
- Cooperative Research and Development Agreements (CRADA)
- Other Teaming Opportunities



SBIR – Small Business Innovation Research Program

SBIR is 2.5% of extramural R&D

- **3 Phase Program**

- **PHASE I**

- Feasibility study
- \$100K award
- 6 months duration

SBIR	FY05	FY06	FY07	FY08	FY09
Millions of \$	110.0	105.6	116.3	103 (86.9*)	117.8**
Phase 1 Awards	291	267	259	276	TBD
Phase 2 Awards	142	186	130	122	TBD

* Adjusted for FY08 funding rescission

** Current N2 projection

- **PHASE II**

- Technology Development
- 2-Year Award
- Up to \$750K

- **PHASE III**

- Technology Infusion/Commercialization Stage.
- Procurement - Use of non-SBIR Funds.

For more information visit <http://sbir.nasa.gov>

STTR – Small Business Technology Transfer Program

- **3 Phase program**
 - **PHASE I**
 - Feasibility study
 - \$100K award
 - 12 months duration
- STTR is 0.3% of extramural R&D.

STTR	FY05	FY06	FY07	FY08	FY09
Millions of \$	13.2	12.3	13.4	13.2	14.1**
Phase 1 Awards	35	27	25	27	TBD
Phase 2 Awards	17	22	18	9	TBD

** Current N2 projection

- **PHASE II**
 - Technology Development
 - 2-Year Award
 - Up to \$750K
- **PHASE III**
 - Technology Infusion/Commercialization Stage.
 - Procurement - Use of non-STTR Funds.

For more information visit <http://sbir.nasa.gov>



NASA Research Announcements - NRAs

- **Sponsor research and development of key technologies related to space and aeronautical sciences**
 - Relevant to NASA missions and programs
- **Target Recipients**
 - Scientists, engineers and educators at U.S. non-profit and commercial organizations, as well as Federal research organizations including NASA's own centers
- **Funding Instruments Used**
 - Grants, Contracts, Interagency transfers & Intra-NASA transfers
- **Prognostics-related NRAs are aligned with the IVHM Tech Plan which can be found at:**
 - http://www.aeronautics.nasa.gov/nra_pdf/ivhm_tech_plan_c1.pdf

For more information visit <http://nspires.nasaprs.com/external>

Sample SBIR / STTR / NRA Awards From Recent Years

	SBIR / STTR	NRA
1	Integrated Diagnosis and Prognosis of Aircraft Anomalies (2008 SBIR)	Ultra Efficient Multiscale Prognostic and Diagnostics Tools for Airframe and Propulsion Structures
2	Integrated System Health Management for Ground Operations (2008 SBIR)	An Integrated Vehicle Health Management Approach to Heterogeneous Structural Systems
3	Digital System e-Prognostics for Critical Aircraft Computer Systems (2007 SBIR)	Development of Early-Indicators for Failure-Prognosis of Power Semiconductor Devices
4	Crucial Component Damage Detection, Monitoring and Mitigation (2007 SBIR)	Diagnostics and Prognostics for Electro-Hydro-Mechanical Systems
5	HyDE Enhancements for IVHM System Deployment (2007 SBIR)	Reliable Diagnostics and Prognostics for Critical Avionics Systems
6	Quantifiable and Reliable Structural Health Management Systems (2007 SBIR)	A Collective-Computation Approach to Prognostics Health Management
7	Integrating Prognostics in Automated Contingency Management Strategies for Advanced Aircraft Controls (2007 STTR)	A Novel Methodology for Prognostics, Uncertainty Representation and Uncertainty Management
8	Data Reduction Techniques for Real-time Fault Detection and Diagnosis, and Multiple Fault Inference with Imperfect Tests (2007 STTR)	Validation and uncertainty management of prognostic algorithms



IPP Seed Fund

- **An annual process for selecting innovative partnerships to address technology barriers via cost-shared, joint-development projects**
 - Seed Fund provides part of the funding needed
- **The IPP Office at NASA HQ issues an annual Seed Fund call to all NASA Centers**
 - Proposals are first selected at center level and sent to HQ for final selections
- **The Seed Fund operates through a collaboration of Center IPP Offices, NASA co-PI, and external co-PI**
- **Proposals are evaluated against the following criteria:**
 - Relevance/Value to NASA Mission Directorates
 - Scientific/Technical merit and feasibility
 - Leveraging of resources
- **In the last two years, an investment of \$19 million by IPP facilitated the generation of 81 partnerships**



Space Act Agreements

- **Primary vehicle to set up a joint undertaking between NASA and an outside partner**
 - Under authority of the Space Act of 1958
 - Objective is to meet wide-ranging NASA mission and program requirements and objectives
 - NASA commits to using its resources including personnel, funding, services, equipment, expertise, information or facilities
- **Agreement Types:**
 - Non-Reimbursable – No funds are exchanged
 - Reimbursable – NASA is re-imbursed for use of facilities, personnel or equipment
 - Memorandum of Understanding (MOU)
 - Interagency



Licensing Agreements

- **Grant licenses on NASA's domestic and foreign patents, patent applications and software**
- **Typical License Terms**
 - Commercialization Plan
 - Duration
 - Royalties
 - Reporting
- **License Types**
 - Exclusive
 - Nonexclusive
 - Limited (partially) Exclusive



Other Agreements

- **NASA Cooperative Research and Development Agreement (CRADA)**
 - To stimulate and support innovative new technologies and products for commercialization via technology research, development and/or deployment



Teaming Opportunities

- **Jointly pursue funded research and development opportunities in the commercial, non-profit and government sectors with a NASA research team**
 - Technology advancement helps further NASA's mission objectives
- **Integrated Systems Health Management (ISHM) and Prognostics are prime areas for this type of teaming**

IPP Publications



<http://www.techbriefs.com/>



<http://www.sti.nasa.gov/tto/>
[http://www.sti.nasa.gov/spinoff/
searchrecord](http://www.sti.nasa.gov/spinoff/searchrecord)



[http://ipp.nasa.gov/innovation/
index.html](http://ipp.nasa.gov/innovation/index.html)

NASA Research Park

Partners Today:

University of California

Carnegie Mellon University

San Jose State University

Foothill-De Anza Community College

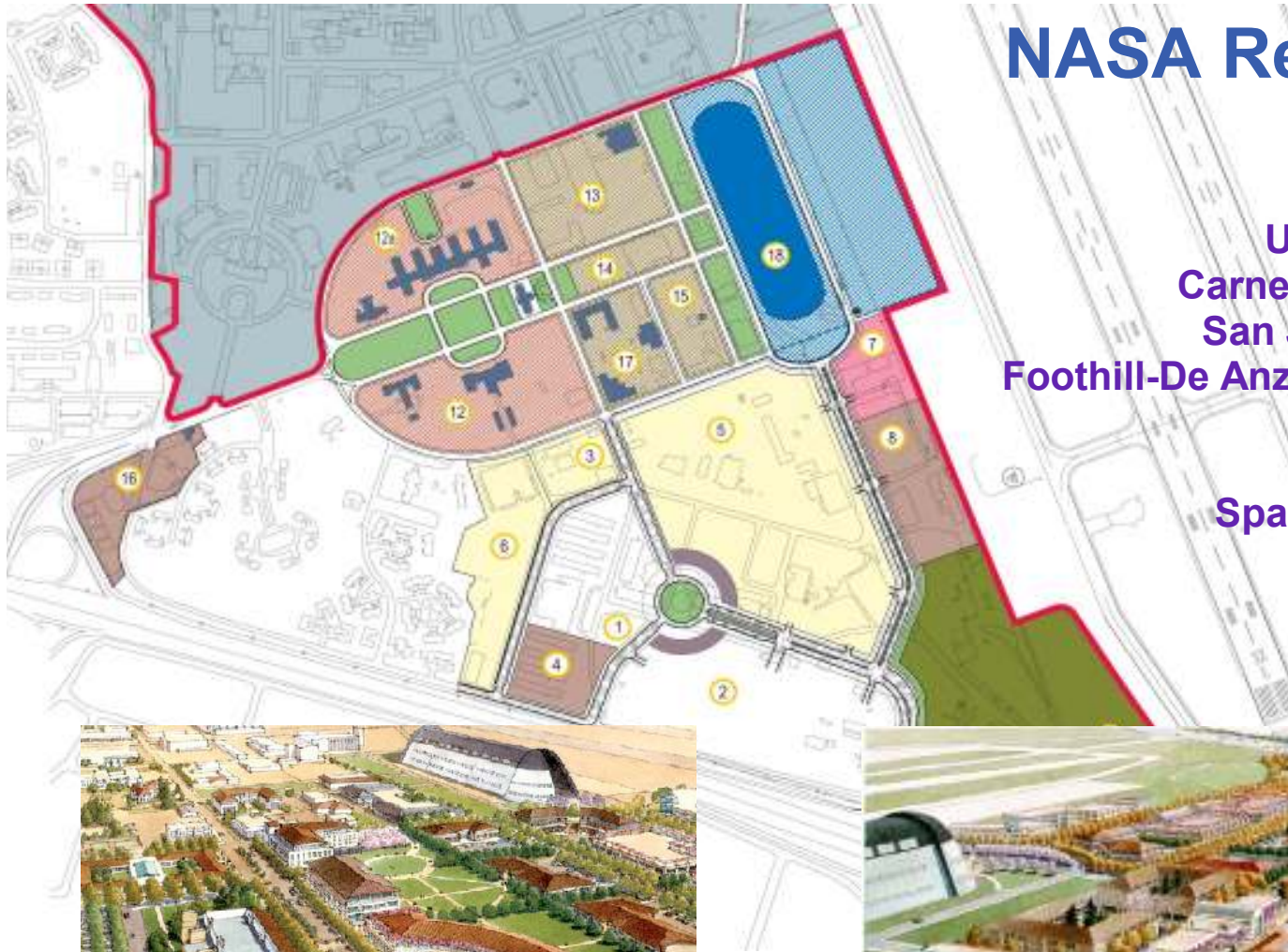
NAFEO

Women in STEM

Space Technology Center

Kentucky Science & Technology Corp

, etc.





NASA Collaboration Summary

- **Prognostics is an important emerging technology for life- and mission-critical applications**
- **The Prognostics Center of Excellence at NASA Ames is one of the leading Prognostics research teams**
- **We are very interested in talking to potential partners from industry, academia and other government agencies**
- **There are a number of mechanisms available for NASA to partner with other organizations**



For More Information

- **SBIR / STTR Program**
 - <http://sbir.nasa.gov>
- **NASA Research Announcements**
 - <http://nspires.nasaprs.com/external>
- **Technical Partnering Issues**
 - Dr. Kai Goebel
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- **Business Related Partnering Issues**
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